

## Choline: Nutrient of Concern

for Moms & More



Sandy Procter, Ph.D., RD/LD

Extension Specialist, KSU Dept. of Food, Nutrition, Dietetics and Health  
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## Today's objectives

1. Understand the vital role choline plays in positive health throughout the life cycle, particularly during pregnancy and lactation
2. Identify foods and supplements that help consumers meet choline recommendations
3. Recommend choline-rich foods during consumer counseling



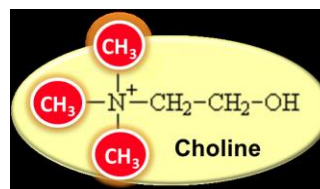
## Choline – Essential nutrient

a compound similar to B vitamins, but not a vitamin... made by humans but not sufficient to meet needs... common in our food sources yet consistently under-consumed... **a nutrient of concern!**



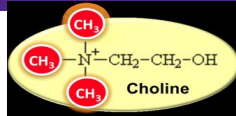
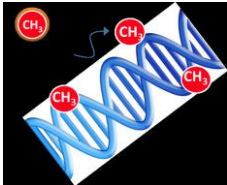
## What is choline?

A unique micronutrient naturally present in some foods, and produced in less-than-adequate amounts in the human body.



## What does choline do?

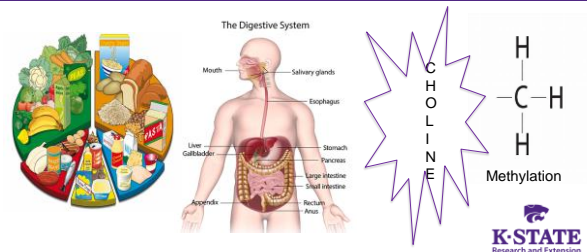
- Structure
- Metabolism
- Regulation



Wide range of roles in humans –  
from *cell structure* to  
*neurotransmitter synthesis*



## How does choline work?



## The public health concern...

U.S. population has suboptimal intakes of choline

Choline deficiency believed to impact:

- liver disease
- atherosclerosis and heart disease
- breast cancer
- possibly neurological disorders



*Is especially vital during pregnancy and lactation*



## Who's at risk?



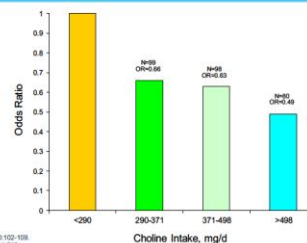
## Choline during pregnancy

- Important role in brain and memory development in fetus
- Decreases risk of neural tube defects and other congenital abnormalities
- Despite enhanced capacity to make choline during pregnancy, demand exceeds supply. Lactation further increases maternal needs



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## HIGHER MATERNAL CHOLINE INTAKE REDUCES RISK OF NEURAL TUBE DEFECTS



Shaw GM, et al. *Am J Epidemiol* 2004;160:102-108.  
Shaw GM, et al. *Epidemiology* 2009;20:714-719.

## More benefits of prenatal choline

- High maternal choline intake
  - eases baby's response to stress
  - decreases risk of pre-eclampsia
  - helps to facilitate transport of nutrients, including DHA, across placenta to the fetus



High choline intake during perinatal period has been demonstrated to have **lasting neuroprotective effect**

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## What can we do now?

- Learn about good food sources of choline
- Educate consumers and providers
- Recommend supplements if appropriate
- Watch for expanding science on choline



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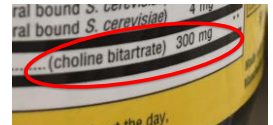
## Food sources of choline

Food	Serving	Total Choline (mg)
Beef liver, pan fried	3 oz.	355
Egg	1 lg.	126
Soybeans	½ c.	107
Salmon	3 oz.	91
Atlantic cod	3 oz.	71
Beef, lean, cooked	3 oz.	67
Brussels sprouts, cooked	1 c.	63
Broccoli, cooked, chopped	1 c.	62
Red potato	1 lg.	57
Milk, skim	1 c.	38
Peanut butter, smooth	2 Tbsp.	20



## What about supplements?

- Difficult or impossible to meet AI by diet
- AAP recommends prenatal supplement
  - Multivitamin + choline is preferred
  - Like folic acid (before pregnancy?)



## During breastfeeding...

- Mammary cells are capable of uptake of choline from maternal blood supply for transfer through breastmilk



## In summary...

### MAIN FUNCTIONS

Structural component of all cell membranes

Transport and metabolism of fat and cholesterol

Helps make some important neurotransmitters

Helps maintain normal levels of homocysteine in the blood

### DAILY RECOMMENDATION



### GOOD SOURCES

#### Eggs

Egg, 1 large, 147 mg



#### Meat

beef, poultry

Beef, 3 oz., 67 mg



#### Seafood

fish, shellfish

Scallops (steamed), 3 ounces, 94 mg



### SPECIAL NOTES

Choline can be made in the body, but not enough to support health. Therefore, it must also be consumed in the diet.

A varied diet should provide enough choline for most people, but **supplement recommended during pregnancy.**



## Need to increase awareness

- among health professionals
  - articles, tool-kits, webinars
  - outreach education pieces
- 2020 Dietary Guidelines for Americans
  - specific recommendations for pregnant and lactating women to increase consumption of choline-rich foods, supplements



## Resources

<http://cholinecouncil.com>



## References

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*Thank you!*

